Notice No.2

Rules and Regulations for the Classification of Offshore Units July 2020

The status of this Rule set is amended as shown and is now to be read in conjunction with this and prior Notices. Any corrigenda included in the Notice are effective immediately.

Please note that corrigenda amends to paragraphs, Tables and Figures are not shown in their entirety.

Issue date: December 2020

Amendments to	Effective date	IACS/IMO implementation (if applicable)
Part 10, Chapter 1, Sections 4 & 17	Corrigenda	N/A
Part 10, Chapter 2, Sections 3, 6 & 7	Corrigenda	N/A
Part 10, Chapter 3, Section 1	Corrigenda	N/A
Part 10, Chapter 4, Section 1	Corrigenda	N/A

Part 10, Chapter 1
General Requirements

■ *Section 4*
Structural arrangement

4.1 General

4.1.3 The Marine Environment Protection Committee of the International Maritime Organization (IMO) has decided that tankers which are used solely for storage and production of oil, and are moored at a fixed location except in extreme environmental or emergency conditions, are not required to comply with all the provisions of the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto (hereinafter referred to as MARPOL) unless specified in whole or in part by the relevant National Authority. Therefore, double hulled construction would not be necessary unless specified by the National Authority. When MARPOL is invoked for ship units, normally also the interpretations for ship units defined in ~~MEPC Circ. 139(53)~~ Resolution MEPC.311(73) are applicable, but this is subject to adoption of ~~MEPC Circ.139~~ Resolution MEPC.311(73) by the National Authority.

■ *Section 17*
Buckling

17.3 Bucking of stiffeners

17.3.2 **Column buckling mode.**
(c) The bending stress in the stiffener is equal to:
$\cancel{\sigma_b = \frac{M_o+M_1}{1000Z_{net}}}$ ~~N/mm2~~ $\sigma_b = \frac{M_o+M_1}{1000Z_{net}}$ N/mm^2
where
P_z = nominal lateral load, in N/mm^2, acting on the stiffener due to membrane stresses, $\cancel{\sigma_x, \sigma_y}$ σ_x, σ_y and $\cancel{\tau_1}$ τ_1, in the attached plate in way of the stiffener midspan:
= $\cancel{\frac{t_{net}}{s}\left(\sigma_{xl}\left(\frac{\pi^s}{1000 l_{stf}}\right)2 + 2c_y\sigma_y + \sqrt{2}\,\tau_1\right)}$ $\frac{t_{net}}{s}\left(\sigma_{xl}\left(\frac{\pi^2}{1000 l_{stf}}\right)^2 + 2c_y\sigma_y + \sqrt{2}\,\tau_1\right)$

17.3.4 **Effective breadth of attached plating.**
(a) The effective breadth of attached plating of ordinary stiffeners is to be taken as:
b_{eff} = min ~~($C_x s$, $c_s s$)~~ ($C_x s$, $\chi_s s$)

Part 10, Chapter 2
Loads and Load Combinations

■ *Section 3*
Dynamic load components

3.1 Symbols

3.1.1 For the purposes of this Section, the following symbols apply:
~~Tθ~~ T_θ = roll period, in seconds, as defined in *Pt 10, Ch 2, 3.5 Motions 3.5.2(a)*
~~Tϕ~~ T_ϕ = pitch period, in seconds, as defined in *Pt 10, Ch 2, 3.5 Motions 3.5.3(a)*
$\alpha_{pitch-z}$ = vertical acceleration due to pitch, is to be taken as:
$\cancel{= \left(0{,}3 + \frac{L}{325}\right)\varphi\left(\frac{\pi}{180}\right)\left(\frac{2\pi}{T_\theta}\right)^2 |x - 0{,}45L|}$ ~~m/s²~~ $= \left(0{,}3 + \frac{L}{325}\right)\phi\left(\frac{\pi}{180}\right)\left(\frac{2\pi}{T_\phi}\right)^2 |x - 0{,}45L|$ m/s^2

α_{surge} = longitudinal acceleration due to surge, is to be taken as:
= 0,2g a_0 m/s^2
$\cancel{= \varphi\left(\frac{\pi}{180}\right)\left(\frac{2\pi}{T_\varphi}\right)^2 R_{pitch}}$ ~~m/s²~~
$\alpha_{pitch-x}$ = longitudinal acceleration due to pitch, is to be taken as:
= $\phi\left(\frac{\pi}{180}\right)\left(\frac{2\pi}{T_\phi}\right)^2 R_{pitch}$ m/s^2

3.2 General

3.2.1 **Application.**

(a) The requirements of this Section apply to structure forward of the forward end of the foremost cargo tank. Where the forward end of the foremost cargo tank is aft of 0,1L of the unit's length, measured from the ~~F.P.~~ FE, special consideration will be given to the applicability of these requirements and the requirements of *Pt 10, Ch 3, 2 Cargo tank region*.

3.4 Return periods and probability factor, f_{prob}

Table 2.3.2 Environmental factors

Unit size and operating condition	Environment *see* Note 2~~,~~	Draught	$f_{\text{Env – Pex – dyn}}$, *see* Note 1		
			At, and aft of, midship	At 0,85L	At ~~FP~~ FE

3.6 Accelerations

3.6.2 **Common acceleration parameter.**

(a) The common acceleration parameter, $\boldsymbol{\alpha_0}$, is to be taken as:

~~$\alpha_0 = (1{,}58 - 0{,}47C_b)\left(\frac{2{,}4}{\sqrt{L}} + \frac{34}{L} + \frac{600}{L_2}\right)$~~

$$\alpha_0 = (1{,}58 - 0{,}47C_b)\left(\frac{2{,}4}{\sqrt{L}} + \frac{34}{L} - \frac{600}{L^2}\right)$$

3.8 Dynamic local loads

3.8.2 **Dynamic wave pressure.**

(a) The envelope dynamic wave pressure $P_{\text{ex-dyn}}$, is to be taken as the greater of the following:

$$P_1 = 2f_{\text{prob}}f_{\text{Env-Pex-dyn}}f_{\text{nl-P1}}\left[\left(P_{11} + \frac{135B_{\text{local}}}{4(B+75)} - 1{,}2(T_{LC} - Z)f_1 + \frac{135B_{\text{local}}}{4(B+75)}f_2\right)\right]$$ ~~kN/m2~~ kNm²

~~$P_2 = 26f_{\text{prob}}f_{\text{Env-Pex-dyn}}f_{\text{nl-P2}}\left[\left(\frac{B_{\text{local}}}{8}\theta\left(\frac{\pi}{180}\right) + f_T C_b\frac{0{,}25B_{\text{local}}+0{,}8C_{wv}}{14}\left(0{,}7 + \frac{2z}{T_{LC}}\right)\right)f_1 + \left(\frac{B_{\text{local}}}{8}\theta\left(\frac{\pi}{180}\right) + f_T C_b\frac{0{,}25B_{\text{local}}}{14}\left(\frac{2z}{T_{LC}}\right)\right)f_2\right]$ kN/m2~~

$$P_2 = 26f_{\text{prob}}f_{\text{Env-Pex-dyn}}f_{\text{nl-P2}}\left[\left(\frac{B_{\text{local}}}{8}\theta\left(\frac{\pi}{180}\right) + f_T C_b\frac{0{,}25B_{\text{local}}+0{,}8C_{wv}}{14}\left(0{,}7 + \frac{2z}{T_{LC}}\right)\right)f_1 + \left(\frac{B_{\text{local}}}{8}\theta\left(\frac{\pi}{180}\right) + f_T C_b\frac{0{,}25B_{\text{local}}}{14}\left(0{,}7 + \frac{2z}{T_{LC}}\right)\right)f_2\right]$$ kN/m²

3.8.3 **Green sea load.**

(a) The envelope green sea load on the weather deck, P_{wdk}, is to be taken as the greater of the following:

$$P_{wdk} = f_{1-dk}\left(f_{op}P_{1-WL} - 10z_{dk-T}\right) \text{ kN/m}^2$$

$$P_{wdk} = 0{,}8\, f_{2-dk}\left(P_{2-WL} - 10z_{dk-T}\right) \text{ kN/m}^2$$

$$P_{wdk} = 34{,}3 \text{ kN/m}^2$$

where

f_{op} = 1,0 at, and forward of, 0,2L from ~~A.P.~~ AE.

= 0,8 at, and aft of, ~~A.P.~~ AE.

3.8 Dynamic local loads

3.8.2 **Dynamic wave pressure.**

(a) The envelope dynamic wave pressure, $P_{\text{ex-dyn}}$, is to be taken as the greater of the following:

$$P_1 = 2f_{\text{prob}}f_{\text{Env-Pex-dyn}}f_{\text{nl-P1}}\left[\left(P_{11} + \frac{135B_{\text{local}}}{4(B+75)} - 1{,}2(T_{LC} - z)\right)f_1 + \frac{135B_{\text{local}}}{4(B+75)}f_2\right] \text{ kNm}^2$$

$$P_2 = 26f_{\text{prob}}f_{\text{Env-Pex-dyn}}f_{\text{nl-P2}}\left[\left(\frac{B_{\text{local}}}{8}\theta\left(\frac{\pi}{180}\right) + f_T C_b\frac{0{,}25B_{\text{local}}+0{,}8C_{wv}}{14}\left(0{,}7 + \frac{2z}{T_{LC}}\right)\right)f_1\right. \text{ kN/m}^2$$
$$\left. + \left(\frac{B_{\text{local}}}{8}\theta\left(\frac{\pi}{180}\right) + f_T C_b\frac{0{,}25B_{\text{local}}}{14}\left(\frac{2z}{T_{LC}}\right)\right)f_2\right]$$

where

$f_{sl} = C_b + \frac{1{,}33}{\sqrt{C_b}}$ at, and aft of ~~A.P.~~ AE.

= C_b between 0,2L and 0,7L from ~~A.P.~~ AE.

$= C_b + \frac{1,33}{C_b}$ at, and forward of, ~~F.P.~~ FE.

Intermediate values to be obtained by linear interpolation

f_{ing} = 1,0 at, and aft of ~~A.P.~~ AE.

= 0,7 for 0,2*L* to 0,7*L* from ~~A.P.~~ AE.

= 1,0 at, and forward of ~~F.P.~~ FE.

■ *Section 6* Combination of loads

6.1 Symbols

6.1.1 For the purposes of this Section, the following symbols apply:

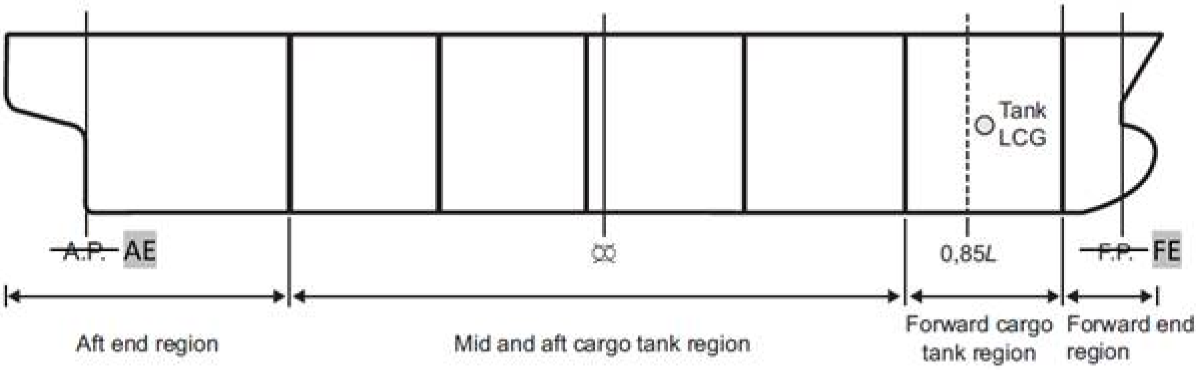
f_{op} = 1,0 at and forward of 0,2L from ~~A.P.~~ A.E.

= 0,8 at and aft of ~~A.P.~~ A.E.

intermediate values to be obtained by linear interpolation, *see Pt 10, Ch 2, 6.3 Application of dynamic loads 6.3.5.(a)*

■ *Section 7* Environmental loads for unrestricted worldwide transit condition

7.1 Dynamic load cases and dynamic load combination factors for strength assessment



Note 1. Dynamic load cases for the mid and aft cargo tank region are applicable to tanks and spaces for the mid and aft cargo tank region.

Note 2. Dynamic load cases for the aft end region are applicable to machinery spaces and other spaces aft of the mid and aft cargo tank region.

Note 3. Dynamic load cases for the forward end region are applicable to tanks and spaces with their longitudinal centre of gravity position forward of 0,85*L* from ~~A.P.~~ AE and forward the mid cargo tank region.

Figure 2.7.1 Illustration of structural regions for DLCF Tables

Part 10, Chapter 3
Scantling Requirements

■ *Section 1*
Scantling requirements

1.3 Hull girder bending strength

1.3.1 **General.**

(a) The hull girder section modulus requirements in *Pt 10, Ch 3, 1.3 Hull girder bending strength 1.3.3* apply along the full length of the hull girder, from ~~AP to FP~~ AE to FE.

1.4 Hull girder shear strength

1.4.1 The hull girder shear strength requirements apply along the full length of the hull girder, from ~~AP to FP~~ AE to FE.

1.5 Hull girder buckling strength

1.5.1 **General.**

(b) The hull girder buckling strength requirements apply along the full length of the ship unit, from ~~AP to FP~~ AE to FE.

1.8 Termination of local support members

1.8.3 **Bracketed connections.**

(c) Minimum net bracket thickness, t_{bkt-nt}, is to be taken as:

$$\cancel{t_{bkt-net} = \left(2 + f_{bkt} Z_{r1-net}\right)\left(\sqrt{\frac{\sigma_{yd-stf}}{\sigma_{yd-bkt}}}\right) \text{mm}}$$

$$t_{bkt-net} = \left(2 + f_{bkt}\sqrt{Z_{r1-net}}\right)\left(\sqrt{\frac{\sigma_{yd-stf}}{\sigma_{yd-bkt}}}\right) \text{mm}$$

1.8.5 **Sniped ends.**

(a) Stiffeners with sniped ends may be used where dynamic loads are small and where the incidence of vibration is considered to be small, i.e. structure not in the stern area and structure not in the vicinity of engines or generators, provided the net thickness of plating supported by the stiffener, t_{p-net}, is not less than:

$$\cancel{t_{p-net} = c_1\sqrt{\left(1000l - \frac{s}{2}\right)\left(\frac{sPk}{1000}\right)} \text{mm}}$$

$$t_{p-net} = c_1\sqrt{\left(1000l - \frac{s}{2}\right)\left(\frac{sPk}{10^6}\right)} \text{mm}$$

1.10 Intersections of continuous support members and primary support members

Table 3.1.7 Weld factors for connection between stiffeners and primary support members

Item	Weld factor
Primary support member stiffener to intersecting stiffener	0,44 $\cancel{\sigma_w}$ σ_{wc} / σ_{perm} not to be less than 0,34
Symbol	
$\cancel{\sigma_w}$ σ_{wc} = direct stress, as defined in *Pt 10, Ch 3, 1.10 Intersections of continuous local support members and primary support members 1.10.3.(e)*	

Part 10, Chapter 4
Dynamic Load Combination Factors

■ *Section 1*
General

1.1 Application

Table 4.1.64 Dynamic load cases for strength assessment by FEM for a weather vaning aframax unit, North Sea

Max. response	M_{wv-h}	
f_{ctr-pt}	~~–0,1~~ –0,2	–0,2
$f_{ctr-stb}$	–0,2	~~–0,1~~ –0,2

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